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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/530,733	02/21/2006	Stefano Barbieri	M0025.0325/P325	2090

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EXAMINER	
GOLUB, MARCIA A	

ART UNIT	PAPER NUMBER
2828	

MAIL DATE	DELIVERY MODE
03/26/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/530,733	BARBIERI ET AL.	
	Examiner	Art Unit	
	MARCIA A. GOLUB	2828	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 January 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) *5,6,13 and 14* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4 and 7-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of an embodiment presented in Figs 1-3, 6-8 and 13, claims 1-4, 7-12 in the reply filed on 1/18/08 is acknowledged.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 7 and 8 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The subject matter of the claims was not described in the drawings or specifications that are relevant to the elected embodiment of Figs 1-3. This rejection can be overcome by withdrawing these claims from consideration.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-4 and 7-12 are rejected under 35 U.S.C. 102(e) as being anticipated by Hwang (6,560,259) hereinafter '259.

Figs. 1 and 5 of '259 disclose a laser comprising:

1. "a substrate comprising a bulk region [101, 108, 131, 502] and a conducting layer [109, 104];

an active region [105] comprising a quantum cascade structure provided on a first surface of the substrate such that said active region is electrically connected to said conducting layer [109, 104];

first and second contacts [122, 124, 511] provided to said conducting layer such that said first and second contacts are electrically connected to said active region, said first and second contacts being disposed on opposite sides of said active region;

and an active region contact provided to said active region such that a potential [510] may be applied between said active region contact and said first and second contacts to cause said active region to lase.

2. "wherein the conducting layer [109] comprises a highly doped semiconductor." ($1x10^{19}$ cm^{-3})

3. "wherein the conducting layer is thin enough [20 nm], such that in operation, the two surface plasmons present at the two interfaces of the conducting layer merge into a single mode." Structure implies function, see MPEP 2112.01.

4. " wherein the cascade laser is configured to emit photons having a frequency in the range from 0.02 THz to 100 THz." No actual structure is recited that would differentiate the invention from the prior art in configuring it to emit in THz range.

9. "wherein said first and second contacts [122, 511] are symmetric about said active region.

7,8. "wherein the resistance between the first and active region contacts or second and active region contacts is less than twice the resistance of the active region." No actual structure is recited that would differentiate the invention from the prior art in making the resistance between the contacts less than twice the resistance of the active layer. Also, it is not clear at what operational voltage/current the resistance is measured.

10. "wherein the dielectric constant of the conducting layer [109] is negative relative to the dielectric constant of the surrounding layers [133]." The dielectric constant of metals and highly doped semiconductors is negative, while the dielectric constant of insulators is positive.

11. "wherein the active region [105] comprises a strip waveguide."

12. "wherein the active region comprises a lamination of layers [InAlAs/InGaAs]

having at least two different band gaps."

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over '259, and further in view of Hooper et al. (2004/0233963) hereinafter '963.

'259 discloses a laser device as described above but does not disclose:

7,8. "wherein the resistance between the first and active region contacts or second and active region contacts is less than twice the resistance of the active region."

However, reducing the resistance of a semiconductor device is well known in the art as is evident by paragraph 0053 of '963. Also, the court have held that optimization of a desired range does not present a patentable difference between prior art and the invention, unless the discovery of the optimal range is accompanied by unexpected results.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of '259 by making the resistance between the contacts to be less than twice the resistance of the active layer for at least the purpose of improving the operational characteristics of the semiconductor laser.

Contact Info

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARCIA A. GOLUB whose telephone number is (571)272-8602. The examiner can normally be reached on M-F 9-6 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on 571-272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Marcia A. Golub
Assistant Examiner
Art Unit 2828

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